Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

St. Francis River

Waterbody Segment at a Glance:

County: St. Francois
Nearby Cities: Farmington
Length of impairment: 3 miles
Pollutants: Biochemical Oxygen Demand (BOD)
Ammonia (NH_3N)

Source: Farmington West Wastewater Treatment Plant

TMDL Priority Ranking: High


State map showing location of watershed

Description of the Problem

Beneficial uses of the St. Francis River

- Livestock and Wildlife Watering
- Protection of Aquatic Life (Cool Water Fishery) and Human Health associated with Fish Consumption
- Irrigation
- Whole Body Contact Recreation (Swimming)
- Boating and Canoeing

Use that is impaired

- Protection of Aquatic Life (Cool Water Fishery)

Standards that apply

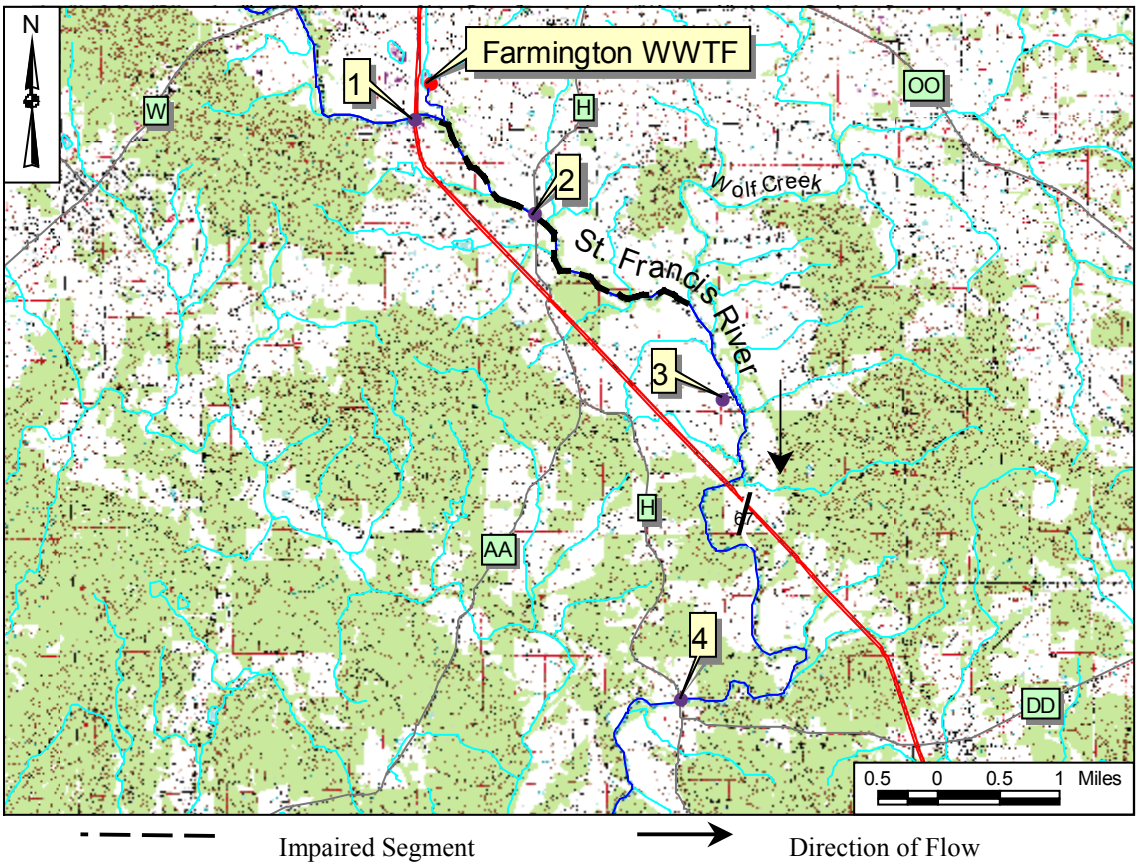
- The Missouri Water Quality Standard (WQS), found in 10 CSR 20-7.031 Table A, for dissolved oxygen in streams is 5.0 mg/L (milligrams per liter or parts per million).
- Ammonia (NH_3N) standards vary depending on the pH and the temperature. The ammonia limits that apply (at a pH of 7.8) are 1.2 mg/L for summer and 2.1 mg/L during the winter. The tables are found at 10 CSR 20-7.031 Table B.

The Farmington West Wastewater Treatment Plant (WWTP) was upgraded in 1990 to accommodate more sewage. Due to concerns that the increased volume of effluent (discharge) might cause violations of the state water quality standards during low flow conditions, the water quality of the receiving stream was tested in July 1992. Both dissolved oxygen (the stream measurement that relates to Biochemical Oxygen Demand, BOD) and ammonia levels were found to exceed water quality standards in the St. Francis River below the WWTP. Wastewater that is

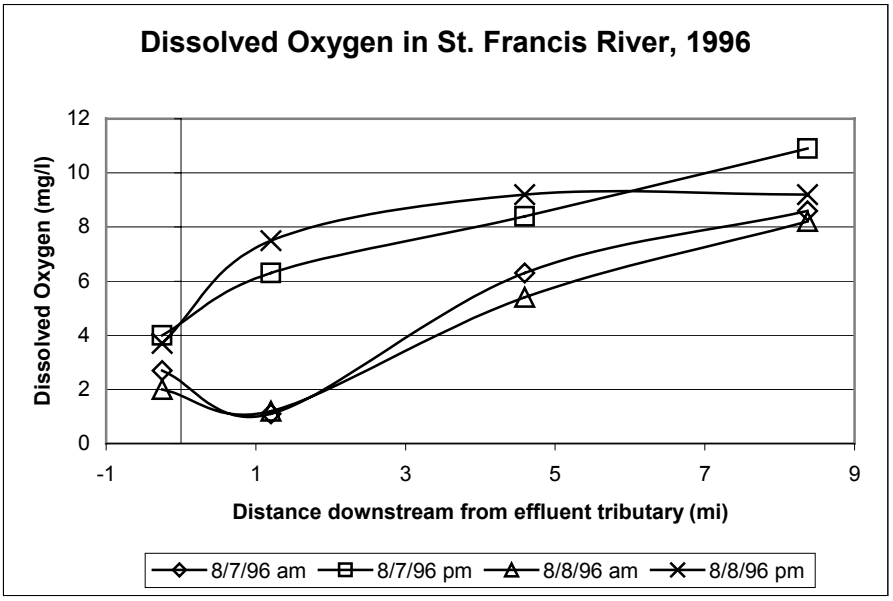
high in BOD lowers the oxygen in the stream. Most aquatic organisms require high levels of oxygen to survive. In addition, ammonia is a common by-product of wastewater treatment and can be toxic to aquatic life.

The Department of Natural Resources did more water quality studies in 1996 and 1997. These studies again documented exceedences of dissolved oxygen (DO) and ammonia standards in at least one mile of the St. Francis River downstream of the WWTP and also low dissolved oxygen concentrations in the St. Francis just *up*stream of the wastewater plant. In August 1999, the department conducted an investigation of possible sources for this low. No discrete point or non-point sources were found upstream of the confluence of the tributary and the river. The observed upstream DO levels are believed to be normal for this river during summer low flow periods.

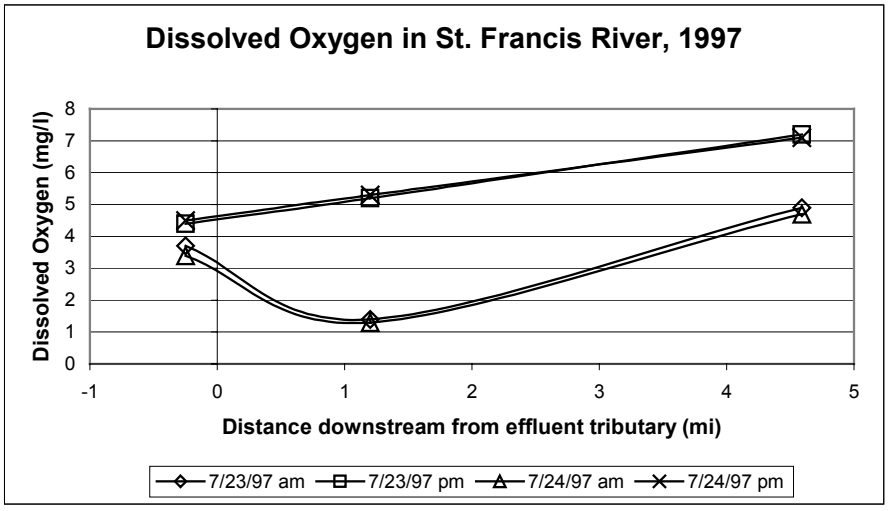
The TMDL was written in 1999, but never approved by the Environmental Protection Agency because of problems with the modeling (to determine the load, or how much of a pollutant the river can handle) and the low background DO. More thorough water quality data was collected in 2001 and the model was rerun. Meanwhile, the Farmington facility underwent another upgrade that was completed November 2001. These improvements should make the effluent clean enough that the river can meet WQS. A map of the area and graphs of the data can be found below.



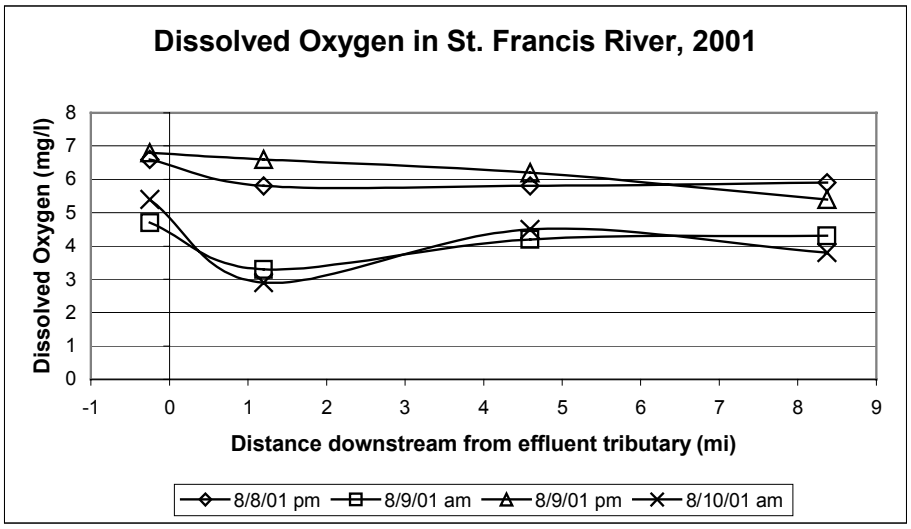
Sample Site Index
1 – St. Francis River 0.25 mile above effluent tributary
2 – St. Francis River above Gruner Ford Conservation Area
3 – St. Francis River 1.75 miles below Wolf Creek
4 – St. Francis River at County Highway H crossing



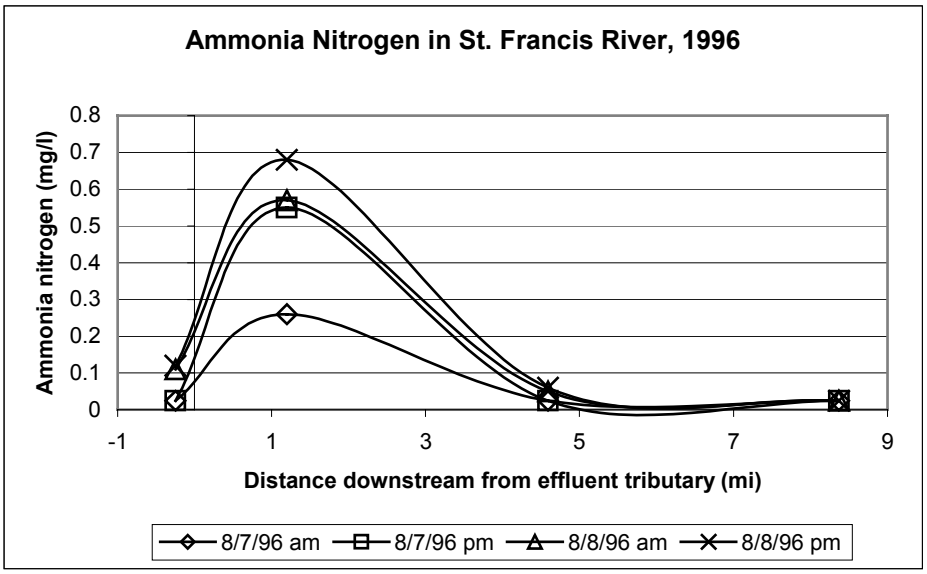
Source: Missouri Department of Natural Resources



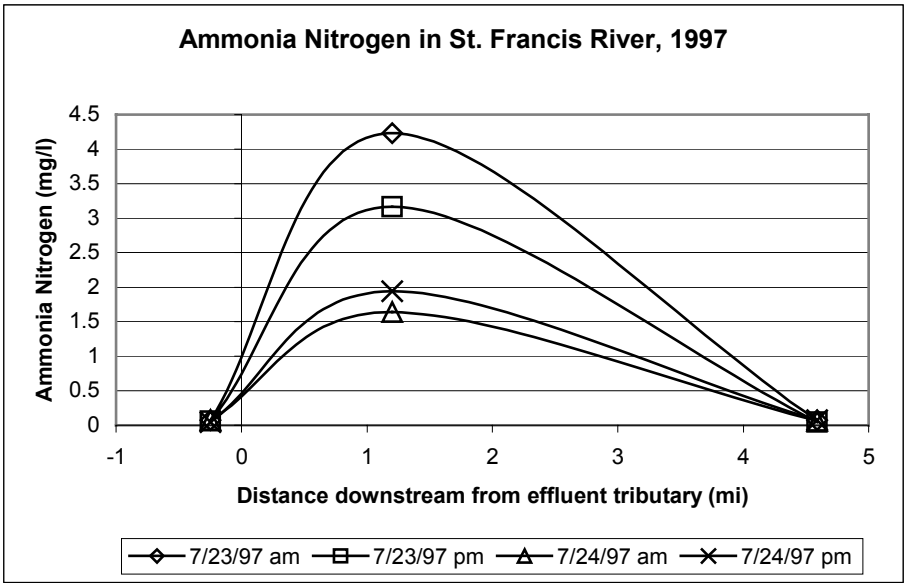
Source: Missouri Department of Natural Resources



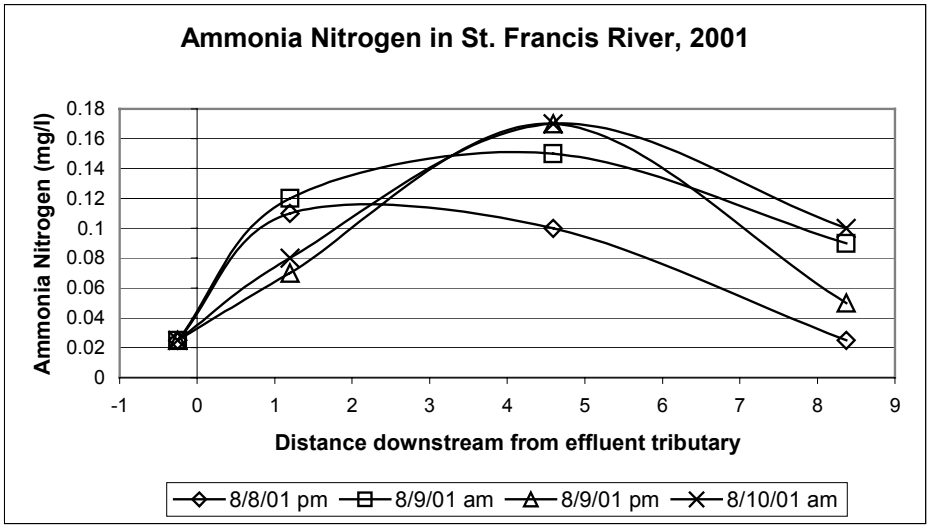
Source: Missouri Department of Natural Resources



Source: Missouri Department of Natural Resources



Source: Missouri Department of Natural Resources



Source: Missouri Department of Natural Resources

For more information call or write:
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